CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Mission Incident
Santa Paula, CA
Preliminary Summary of Air Monitoring Results
December 06, 2014

Prepared by
Center for Toxicology and Environmental Health, L.L.C. (CTEH®)
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CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vac truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for December 06, 2014 07:00 to December 07, 2014 07:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for chlorine (Cl_2), hydrogen sulfide (H_2S), hydrochloric acid (HCl), percent of the Lower Explosive Limit (LEL), oxygen (O_2), peroxides, particulate matter (10 micron particles, PM_{10}), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps including the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A.

CTEH® monitored RAESystems© AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area and an additional three units throughout the day by frac tanks near the designated decon areas. AreaRAEs were equipped with sensors to detect VOCs, LEL, H_2S, and SO_2. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

Particulate monitors were data-logged along the facility perimeter collocated with AreaRAE stations 1, 2, 3, and 4. Table 3 summarizes data-logged PM_{10} data from these units.

Table 1: Manually-Logged Real-Time Air Monitoring Summary[1]
December 06, 2014 07:00 – December 07, 2014 07:00

Location Category	Analyte	Instrument	No. of Readings	No. of Detections	Avg. of Detections	Concentration Range
Community	Cl_2	Gastec 8La	6	0	NA	<0.05 ppm
	H_2S	MR+ / MR Pro	26	0	NA	<1 ppm
	HCl	Gastec 14L	6	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	27	0	NA	<1 %
	O_2	MR+ / MR Pro	23	23	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	6	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	27	27	0.015	0.006 - 0.032 mg/m^3
	SO_2	MR+ / MR Pro	27	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	6	0	NA	<0.2 mg/m3
	VOC	MR+ / MR Pro	26	0	NA	<0.1 ppm
Exclusion Zone	Cl_2	Gastec 8La	6	3	0.133	0.1 - 0.2 ppm
	H_2S	MR+ / MR Pro	4	0	NA	<1 ppm
	HCl	Gastec 14L	2	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	4	0	NA	<1 %
	O_2	MR+ / MR Pro	2	2	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	1	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	4	4	0.009	0.007 - 0.012 mg/m^3
	SO_2	MR+ / MR Pro	4	0	NA	<0.1 ppm
	VOC	MR+ / MR Pro	4	0	NA	<0.1 ppm
Work Area	Cl_2	Gastec 8La	5	0	NA	<0.05 ppm
		MR+ / MR Pro	15	0	NA	<0.1 ppm
	H_2S	Gastec 4LL	1	0	NA	<0.1 ppm
		MR+ / MR Pro	30	0	NA	<0.1 ppm
	HCl	Gastec 14L	2	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	30	0	NA	<1 %
	O_2	MR+ / MR Pro	29	29	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	11	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	25	25	0.025	0.006 - 0.037 mg/m^3
	SO_2	MR+ / MR Pro	30	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	7	0	NA	<0.2 mg/m3
	VOC	MR+ / MR Pro	30	0	NA	<0.1 ppm

[1] *Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2] *Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 2: AreaRAE Air Monitoring Summary[1]
December 06, 2014, 2014 07:00 – December 07, 2014 07:00

Unit ID	Analyte	No. of Readings	No. of Detections	Avg. of Detections	Detection Range
Unit 01	H_2S	5307	1	0.1 ppm	0.1 - 0.1 ppm
	LEL	5307	0	NA	< 1 %
	SO_2	5307	2	0.1 ppm	0.1 - 0.1 ppm
	VOC	5307	200	0.1 ppm	0.1 - 0.1 ppm
Unit 02	H_2S	5431	4	0.2 ppm	0.1 - 0.3 ppm
	LEL	5431	0	NA	< 1 %
	SO_2	5431	0	NA	< 0.1 ppm
	VOC	5431	41	0.1 ppm	0.1 - 0.3 ppm
Unit 03	H_2S	5449	0	NA	< 1 ppm
	LEL	5449	0	NA	< 1 %
	SO_2	5449	0	NA	< 0.1 ppm
	VOC	5449	0	NA	< 0.1 ppm
Unit 04	H_2S	5454	207	0.1 ppm	0.1 - 0.1 ppm
	LEL	5454	0	NA	< 1 %
	SO_2	5454	0	NA	< 0.1 ppm
	VOC	5454	0	NA	< 0.1 ppm
Unit 06	H_2S	1842	812	0.2 ppm	0.1 - 0.4 ppm
	LEL	1842	0	NA	< 1 %
	SO_2	1842	1	0.1 ppm	0.1 - 0.1 ppm
	VOC	1842	260	0.1 ppm	0.1 - 0.2 ppm
Unit 07	H_2S	1540	425	0.1 ppm	0.1 - 0.2 ppm
	LEL	1540	0	NA	< 1 %
	SO_2	1540	4	0.1 ppm	0.1 - 0.1 ppm
	VOC	1540	0	NA	< 0.1 ppm
Unit 08	H_2S	1746	11	0.1 ppm	0.1 - 0.1 ppm
	LEL	1746	0	NA	< 1 %
	SO_2	1746	251	0.1 ppm	0.1 - 0.1 ppm
	VOC	1746	100	0.1 ppm	0.1 - 0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 3: AM510 PM_{10} Monitoring Summary[1]
December 06, 2014, 2014 07:00 – December 07, 2014 07:00

Serial No.	Location	No. of Readings	No. of Detections	Avg. Detection	Detection Range
10704075	AR01	140	140	0.014	0.006 - 0.025 mg/m3
10601072	AR02	2933	2933	0.011	0.001 - 0.521 mg/m3
10407074	AR03	2831	2831	0.013	0.002 - 0.073 mg/m3
11005015	AR04	2668	2668	0.012	0.002 - 0.209 mg/m3

Appendix A

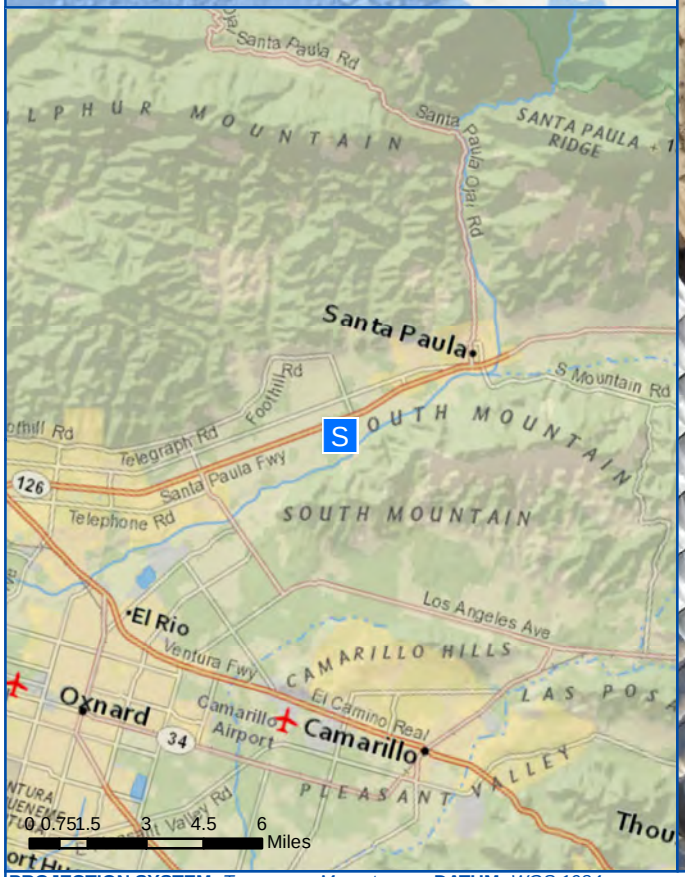
Incident Maps:

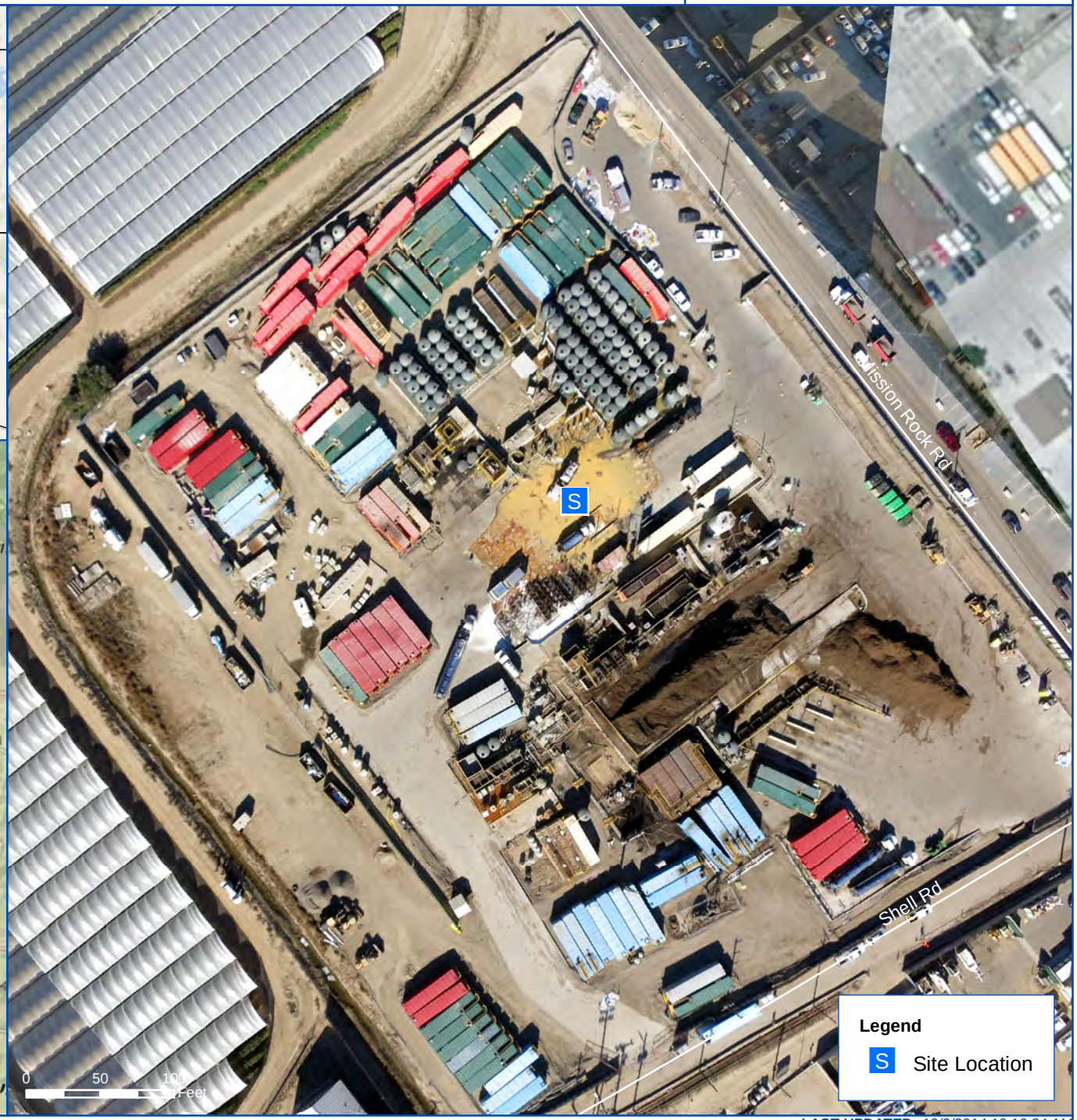
Real-time Air Monitoring Locations and Incident Site

Site Location

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura





PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/2/2014 10:10:34 AM*

Fixed Community Real-Time Air Monitoring Station Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *11/25/2014 12:22:02 PM*

Aerial Overview - 12/06/2014

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/6/2014 3:26:29 PM*

Manually Logged Real-Time Air Monitoring Concentrations

VOC - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/7/2014 9:27:02 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2SO_4 - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/7/2014 9:23:34 AM*

Manually Logged Real-Time Air Monitoring Concentrations

SO_2 - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/7/2014 9:20:50 AM*

Manually Logged Real-Time Air Monitoring Concentrations

PM$_{10}$ - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/7/2014 9:16:23 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Peroxides - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/7/2014 9:13:25 AM*

Manually Logged Real-Time Air Monitoring Concentrations

O_2 - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/7/2014 9:12:24 AM*

Manually Logged Real-Time Air Monitoring Concentrations

LEL - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/7/2014 9:09:10 AM*

Manually Logged Real-Time Air Monitoring Concentrations

HCl - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/7/2014 9:14:34 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2S - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/7/2014 9:04:45 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Cl_2 - Dec 06, 2014 07:00 to Dec 07, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/7/2014 9:02:47 AM*

Appendix B:

AreaRAE Trend Graphs, AM510 Trend Graphs, and AreaRAE/AM510 Air Monitoring Location Map

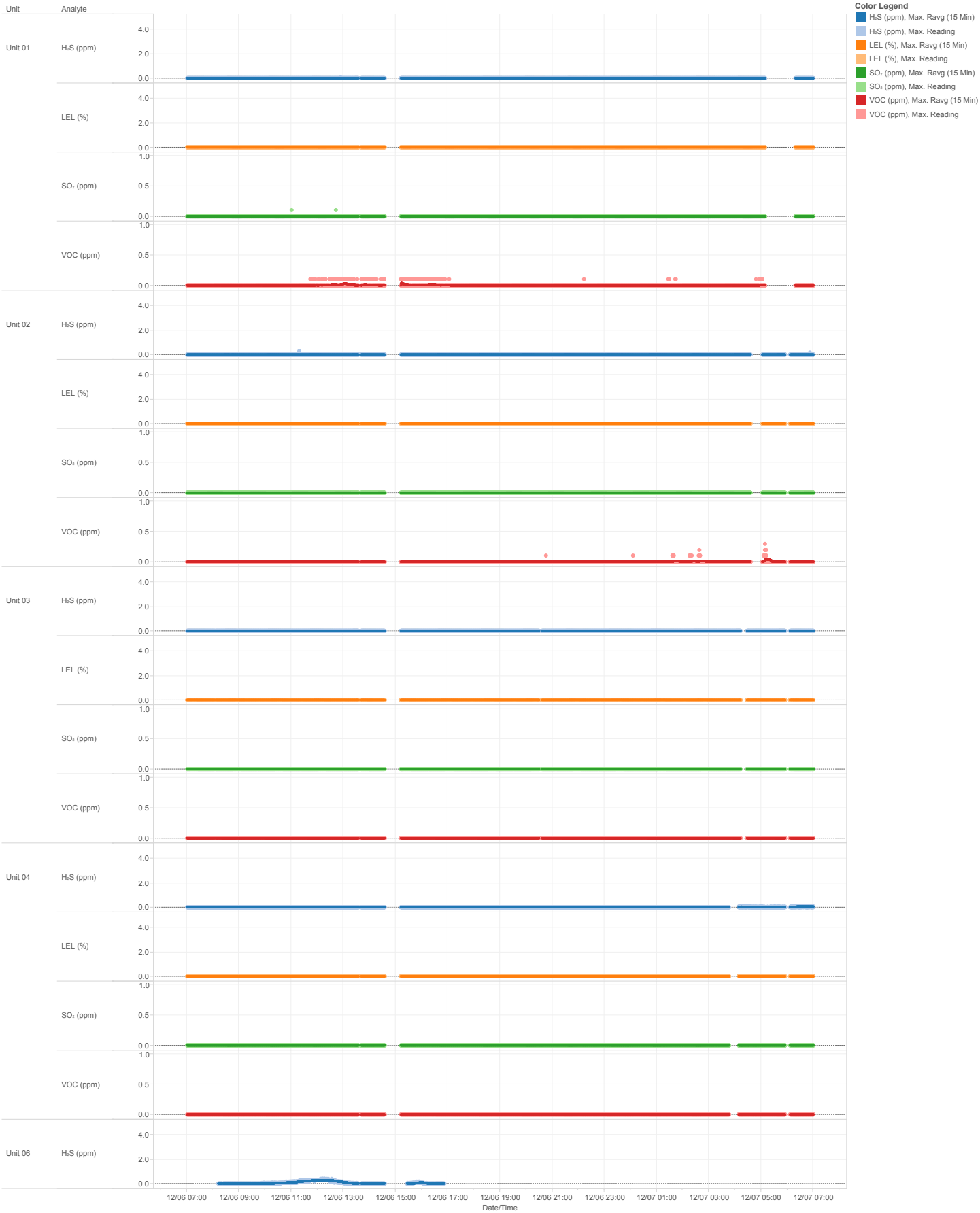
AreaRAE and AM510 Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

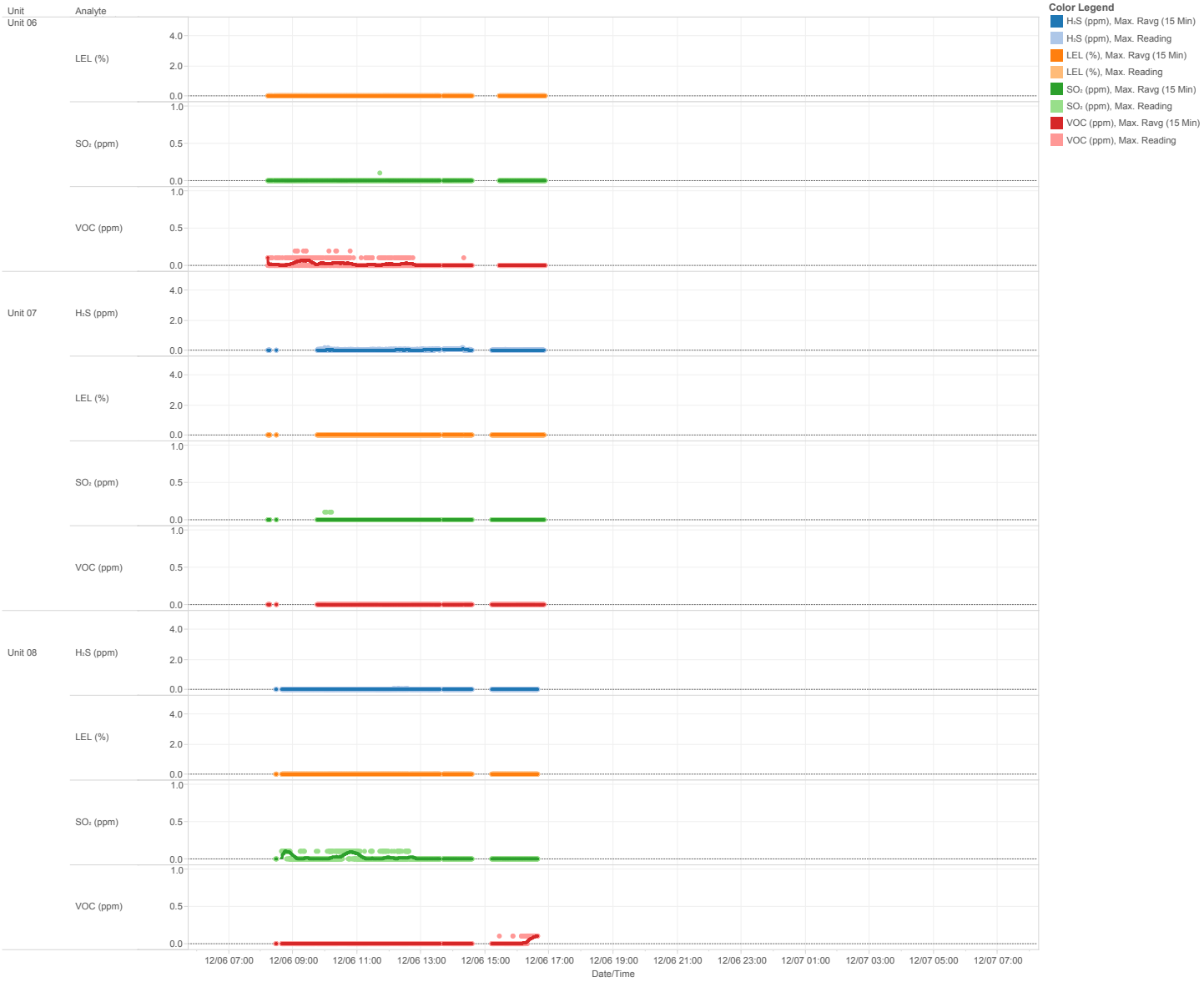
PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/6/2014 6:21:50 PM*

Patriot Environmental
AreaRAE Trend Graphs
12/06/2014 07:00 - 12/07/2014 07:00



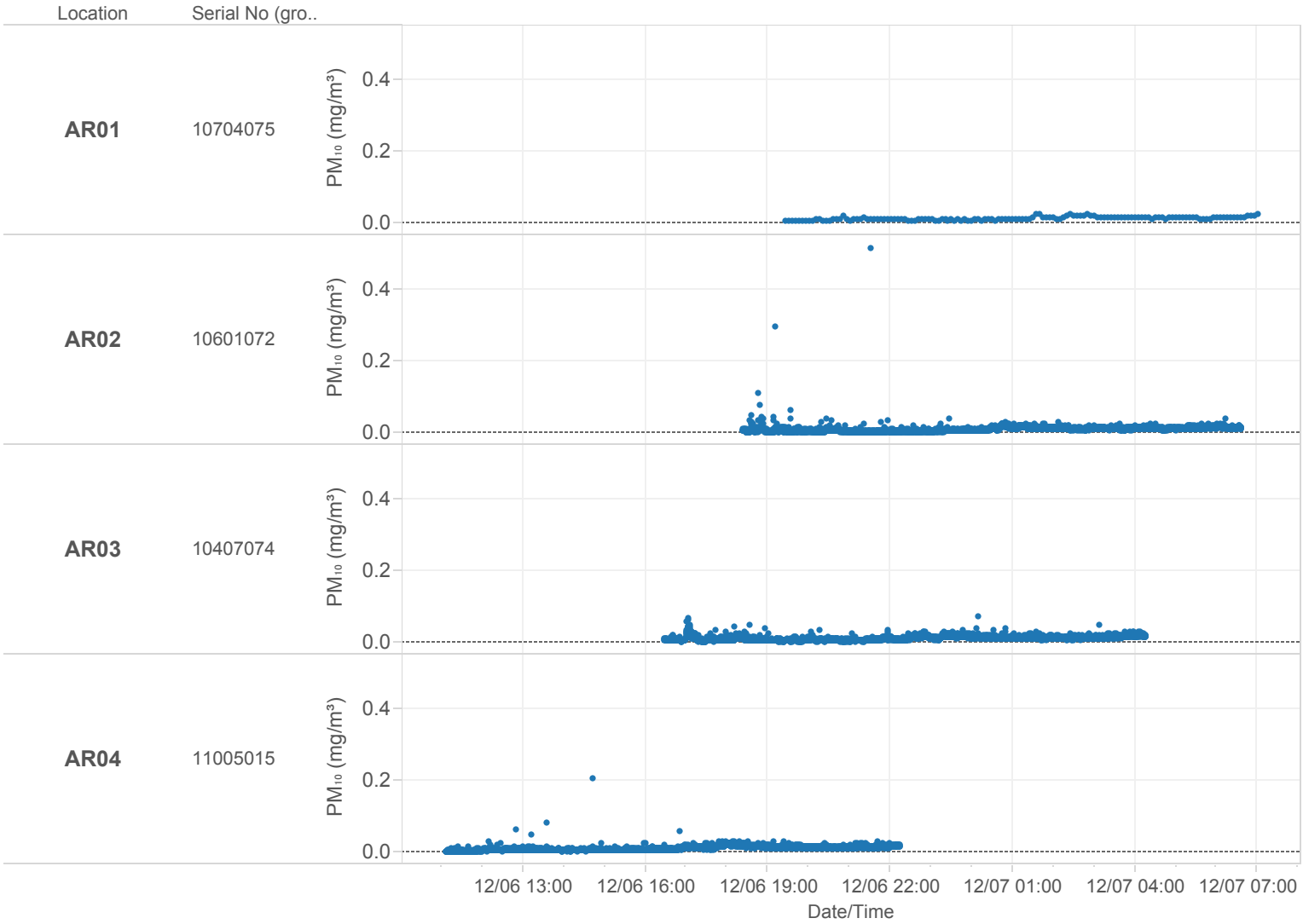
- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
AreaRAE Trend Graphs
12/06/2014 07:00 - 12/07/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
MISSION INCIDENT
Datalogged AM510 (PM_{10}) Summary
12/06/2014 07:00 - 12/07/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format